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# Federal Farm Program Payments (1990-2001): An Analysis of Changing Dependency and The Distribution of Farm Payments in South Dakota

Larry Janssen

*South Dakota State University*

Yonas Hamda

*South Dakota State University*

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**Federal farm program payments (1990 – 2001):  
an analysis of changing dependency and the  
distribution of farm payments in South Dakota**

**by**

**Dr. Larry Janssen and Mr. Yonas Hamda**

**Economics Staff Paper 2005 – 2**

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Dr. Janssen is Professor of Economics at South Dakota State University, Brookings SD; Mr. Yonas Hamda is a U.S. Peace Corp Volunteer working in Ghana and was previously a graduate student in the Dept. of Economics, SDSU, Brookings, SD. Funding for this research was from the Agricultural Experiment Station of South Dakota. This selected paper is also available electronically at the Ag Econ Search website: <http://agecon.lib.umn.edu/>. In the "search" box, type in the authors last name and select from the list of papers listed.

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# **Federal farm program payments (1990 – 2001): an analysis of changing dependency and the distribution of payments in South Dakota<sup>1</sup>**

**Dr. Larry Janssen and Mr. Yonas Hamda<sup>2</sup>**

## **Abstract:**

The growing dependence of the state and local economy and the farm sector on Federal farm program payments is highlighted in this South Dakota case study. The concentration and distribution of farm program payments to recipients at the county, regional and state level from 1996 – 2001 is examined. Reasons for and implications of growing inequality of farm program payments are discussed.

## **Background:**

Examining the distribution of and the changing dependency of the farm sector and state-local economies on farm program payments is of continuing interest and importance to farmers, farmland owners, and policy makers. A review of United States (U.S.) farm economic conditions from the 1990's to present and passage of the Farm Security Act of 2002 indicates continued importance of farm program payments to U.S. agriculture. Farmers and farmland owners, especially in the Midwest and Great Plains, rely on farm program payments for debt servicing, payment of other business expenses, and as a source of household income. The agricultural economics literature also contains many

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<sup>2</sup> Dr. Janssen is Professor, Department of Economics, South Dakota State University (SDSU), Brookings, SD; Yonas Hamda is currently a community development volunteer in Ghana with the U.S. Peace Corp and was previously a graduate research assistant in the Department of Economics, SDSU, Brookings, SD. Funding for this research was from the Agricultural Experiment Station of South Dakota.

studies highlighting the relative importance of farm program payments on farmland values and rental rates (Moss and Schmitz, ed. 2003).

One important issue with farm program subsidies is their distribution.<sup>3</sup> A key earlier study using 1987 data, a time of high program expenditures and dependence on farm programs, showed that 60% of direct farm program payments went to cash grain producers; 16% of all farms obtaining program payments received payments of \$25,000 or more and the same group received 69% of total payments; non-family corporations and farms with annual sales exceeding one million dollars received the largest payments per farm. The inequality of payment distribution was directly related to the amount of production or acres planted to program crops, adjusted for historical differences in productivity, and to participation in specific land conservation programs (Reinsel, 1990).

The Northern Plains, which includes South Dakota, is considered to be one of the most farm program dependent regions in the U.S. Farm program payments to South Dakota farmers and landowners steadily increased from 1990 to 2001. Thus, examination of dependency on farm program payments and their distribution is of interest to South Dakota and may contribute toward greater understanding of the impacts of national programs on various regions of the United States

The focal point of this paper is to examine farm program payment dependency in South Dakota and distribution of farm program payments to recipients at the state and

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<sup>3</sup> The U.S. agricultural policy literature and reference books examine many direct and indirect impacts of farm programs on regional and national economies, on international trade and the competitive position of U.S. agricultural subsectors, and on rural development (see for example, Knutson, et.al. 1996; Tweeten, 1989). This study only examines direct impacts of farm program payments and distribution of farm program payments in South Dakota.



local level. The overall objectives are: (1) to estimate the magnitude of and changing level of dependency on farm program payments, (2) to examine the distribution of farm program payments to recipients, and (3) to assess the relative importance of factors explaining changing level of dependency on and distributional inequality of farm program payments.

The first objective used county, regional, and state-level farm program and general economic data from South Dakota for the 1990 to 2001 time period, while the second and third objective used more detailed farm program data for the 1996 – 2001 time period to examine distribution of payments to recipients at the county, regional, or state level (Hamda, 2004). Following a brief survey of previous works, data and methods associated with each objective are discussed along with presentation of empirical results. Finally, results are discussed in the context of other distributional impact studies and implications are suggested.

### **Selected Previous Works**

Cordes and Van der Sluis (2001) recommend intra-regional analysis of federal transfer payments and expenditures, especially farm program payments, to improve our understanding of the economic role of federal activity in the Great Plains states and between urban centers and more rural locations. These authors generally found that residents of rural non-metropolitan counties were much more dependent on both federal transfer payments to individuals (social security, medicare and medicaid, veterans benefits, etc) and on farm program payments than residents of non-metropolitan trade centers or metropolitan counties. Results for South Dakota indicate that Federal

payments to individuals plus farm program payments in 1999 were more than 25 percent of personal income in rural counties, compared to 20 (15) percent of personal income in small (large) non-metropolitan trade center counties, and only 10.2 percent of personal income in metropolitan counties. Farm program payments were more than one-third of all federal payments in rural and frontier counties, compared to only 6 percent of federal payments in metropolitan counties (Van der Sluis and Cordes, 2002). The authors indicated that farm program payments are especially important in a locality as the degree of rurality increases and examined in the context of all Federal payments to the region.

National studies have examined the magnitude and distribution of Federal farm program payments (FPP) to U.S. farmers and farmland owners. For example, in fiscal 1992, the federal government paid farmers and farmland owners \$5.8 billion in direct cash farm program payments. One-half of the recipients received a payment of \$4,400 or less and three-quarters received less than \$11,484. However, the top five percent that received payments collected 31% of total payments or \$1.798 billion which is an average of \$36,000 per recipient. This unequal distribution of payments once again is the result of commodity support and land retirement programs where payments are largely determined by production (historical base or current production) and acreage enrolled (Ahearn and Whittaker, 1993).

More recently the Environmental Working Group (EWG) has focused their attention on farm program payment (FPP) inequality issues (EWG, 2001a,b). Two well known EWG studies focused on farm program payments in a farm-dependent Texas Congressional district and another on payments to farmland owners living in the nation's

50 largest cities. The data was aggregated from individual recipient farm program payment data obtained from USDA through the Federal Freedom of Information Act.

In general, a small number and proportion of recipients received most of the subsidy payments, regardless of farm operator or landowner status. From 1996 to 2001, the EWG study found that over 74,000 recipients from downtown addresses of New York, Los Angeles, Chicago, Miami and other large cities received checks worth more than \$3.5 billion. Another finding is the flow of payment from other states. For example, farms in 42 states provide payments benefits to recipients in New York City, 38 states send farm payments to Los Angeles, and 37 states have farm payment recipients in Chicago. Moreover, the distribution of farm payments in big cities resembles the distribution in the countryside's (large amount of inequality).

The distributional findings for federal payments, including farm program payments, should be examined in the context of earnings, income, or wealth distributions of households, preferably recipients or farm operator / farmland owner households. This specific information was not available, but our study findings can be placed in the context of national surveys on household earnings, income, and wealth distribution<sup>4</sup> (Diaz-Gimenez, 1997). Of the three variables, wealth is the most concentrated; earnings rank second, and income is the most dispersed. The correlation between earnings and income is very high, while the correlations of earnings and wealth or income and wealth are

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<sup>4</sup> Distribution of labor earnings, income, and wealth (net worth) was obtained from the Survey of Consumer Finances (SCF) and the Panel Study of Income Dynamics (PSID). Income is revenue from all sources before taxes and includes labor earnings, rental payments, interests, and dividends, and transfer payments. Wealth is unspent past income and is the source of capital income and may include real estate, machinery, equipment etc.



surprisingly very low. These correlations of inequality differ by age, employment status, education, and marital status.

This study finds that self-employed workers (such as farmer and ranchers) were nearly 11% of the sample and had income levels higher than the sample average and the amount of wealth was more than three times the sample average. The gini coefficient indices of inequality for this employment group were 0.606 for earnings, 0.618 for income, and 0.758 for wealth (Diaz-Gimenez, 1997).

For the entire sample, earnings and income level and their degree of inequality increased with age of household head until age 50 to 55 years. Education level also plays an important role in the determination of labor earnings and the distribution of earnings, income and wealth. The study finds, as expected, strong association between the education level and economic performance of households.

### **Data and Methods**

South Dakota, which usually ranks in the top 10 states in the amount of Federal farm program payments, is often considered as one of the states that is chronically dependent on farm program payments. Thus, South Dakota represents an important case study of farm program payment dependency and distributional issues at the state and local level. In this study, farm program payment and other economic data were examined at three levels of aggregation: state-level, four agricultural regions that comprise the state, and eight counties selected to represent the non-metropolitan economic diversity of the

state – two frontier, two rural, two small trade center, and two large trade center counties<sup>5</sup> (Van der Sluis and Cordes, 2002). The location of South Dakota regions and eight selected counties<sup>6</sup> are shown in Figure 1.

Regional level and micro-level (program recipient) data are required to accomplish the objectives. To address the first objective, descriptive tables were constructed using state and county level data from the U.S. Dept. of Commerce, Bureau of Economic Analysis (BEA) from 1990 – 2001. These tables consist of economic variables related to dependency on different types of government payments for the state of South Dakota, its four regions, and eight representative counties. Analyses of dependency on farm program payments is examined for two six-year periods, 1990 – 1995 and 1996 – 2001, which are related to the impacts of the 1990 and 1996 farm program legislation.

Micro-level (Federal farm program payment per recipient) data obtained from USDA – FSA and from Environmental Working Group (EWG) from 1996 – 2001 were aggregated to and examined at the state, sub-state region, and selected county levels. In this case, available data were limited to annual payments by type of farm program (commodity, conservation, and disaster) payment per recipient. Payment data per

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<sup>5</sup> Socio-economic classification of non-metropolitan counties in South Dakota follows the typology used by Van der Sluis and Cordes, 2002. Frontier and rural counties have no city of 2500 or more population. The 30 frontier counties have a population density of less than six persons per square mile, while the 17 rural counties have population density of six persons or more per square mile. Seven small trade center counties have a city between 2500 and 7499 people, while nine large trade center counties have a city of at least 7500 people.

<sup>6</sup> Non-metropolitan counties selected by Hamda for indepth analyses of federal payments and farm program payments were Haakon and Edmunds (frontier) counties, Moody and Day (rural) counties, Tripp and Meade (small trade center) counties, and Yankton and Beadle (large trade center) counties.

recipient per year (or series of years) were sorted from highest to lowest payment amount. Gini coefficients, used as a measure of payment concentration, were calculated from the sorted payment data. Measures of payment skewness and related distributional measures were also calculated from the sorted data. Descriptive tables were prepared to summarize total farm program payments, average payment per recipient, and distribution of payments per quintile of recipients. Multiple regression (general linear model) was used to examine the relative influence of several economic variables on the level of farm program payments and level of gini-coefficients over the time period examined.

### **Regional and State Emphasis in Reporting Results**

For the sake of brevity, most of the results reported in this paper are at the state or regional (sub-state) level of aggregation. More detailed and complete tables are available in Hamda (2004). Statewide and regional reporting is appropriate due to the diversity of agricultural characteristics and in the relative importance of agriculture in different parts of the state. Most (44.3 of 48.0 million acres) of South Dakota's land is used for agricultural purposes (table 1). Crop /hay production generates nearly one-half of total farm product receipts in South Dakota and 44% of its farmland acres are devoted to cropland related uses. More than 40% of the state's cropland acres is leased (South Dakota Ag Statistics, 2002).

The cropland intensive East Central / Southeast (ECSE) region, which includes the Sioux Falls metropolitan area, has two fifths of South Dakota's population, one-third of its farms, and one-seventh of its farmland (table 1). The rangeland intensive Western region, which includes the Rapid City metro area and the Black Hills, has more than one-



fourth of the state's population, one-fifth of the states farms and ranches, and 45.3% of its agricultural land. The North Central / Northeast (NCNE) and the South Central / Central (SCC) regions one-third of South Dakota's population but no metropolitan counties, two-fifths of its agricultural land, and 46% of its farms. Average farm size varies from 643 acres in the ECSE region to 3353 acres in the western region. The proportion of cropland and rangeland is reversed (82% to 18%) between the ECSE and western regions.

These regional characteristics are related to the diversity of results reported in the next sections. County-level results, also reported by Hamda (2004), reveal even greater diversity of results related to dependency on farm program payments and to the distribution of farm program payments to recipients.

### **Results and Discussion: Farm Program Payment Dependency**

During the 1990 – 2001 period, federal payments to South Dakota residents averaged 16.7% of personal income, while farm program payments (FPP) averaged 2.7% of personal income. The relative importance of farm program payments from 1990 – 1995 to 1996 – 2001 increased from 2.4% to 3.0% of personal income, while the relative importance of federal transfer payments declined slightly over the same period (table 2).

Relative to statewide averages, FPP as a percent of personal income and as a percent of all Federal payments were considerably higher in the more rural NCNE and SCC regions and lowest in the western region and the more urbanized ECSE region (table 3). In general, FPP was a higher percent of personal income and of all Federal transfer payments in the rural and frontier counties compared to the trade center counties (Hamda, 2004).



The ECSE region had the lowest dependence on federal payments as a percent of personal income and was the only region to show a relative decline in dependence on all federal payments from 1990 – 1995 to 1996 – 2001, despite increasing dependence on FPP. Western South Dakota was the only region to show a decline in dependence on FPP between the two sub-periods, but this was due to extremely low farm income in both sub-periods and minimal growth in FPP relative to other regions of South Dakota.

The dependence of net farm income on Federal farm program payments (FPP) varied considerably by location in South Dakota. Statewide, farm program payments averaged 36.4% of net farm income in the 1990 – 95 time period and 53.7% in the 1996 – 2001 time period. The lowest dependency rate was in the most cropland-intensive ECSE region while the highest dependency rate was in the western (range livestock and wheat ranches) region, which was the only region with FPP exceeding net farm income in most years examined. The dependency rate of farm income on FPP increased considerably in all regions from 1990-1995 to the 1996-2001 period (table 3).

The above results occurred during a time period, 1990 – 2001, when personal income in South Dakota increased at an annual rate of 5.4%, non-farm income grew at a 5.8% annual rate, and federal transfer payments to individuals (not including FPP) increased at a 5.7% annual rate. Increases in personal income, non-farm income, and federal transfer payments occurred each year in this 12 year period. However, farm income was very unstable during this period with an 18% greater amount of farm income during the 1996 – 2001 time period than in the earlier 1990 – 1995 period. Farm program

payments generally declined from 1991 to 1996 to a low of \$229 million, but increased to about \$790 million in both 1999 and 2000 (table 2).

Growth rates in personal income, non-farm income, and federal transfer payments were positively and highly correlated with the extent of population growth in each region. Three-fifths of the state's increase in population from 1990 – 2001 occurred in the ECSE region, mostly in metropolitan and trade center counties, while the remaining population growth occurred in the western and SCC regions, as the NCNE region had almost no change in population.

The amount of federal farm program payments doubled from the 1990 – 1995 period to the 1996 – 2001 period in the ECSE, NCNE, and SCC regions, but increased only 3% in the western region. This is closely related to major growth in amount of commodity program (feed grain, wheat and soybean) related payments after 1996, which favored areas raising program crops. Statewide and in all regions, except the ECSE region, the dollar amount of increase in farm program payments between the two six year periods was greater than the dollar amount of increase in farm income!

Increases in farm income from 1990 – 1995 to 1996 – 2001 was strongest (+31%) in the cropland intensive ECSE region, close to the statewide average (+18% to +20%) in the NCNE and SCC regions, but declined 30% in the western region. The ratio of farm income to total personal income declined, statewide and in all regions of South Dakota during the 1990 - 2001 period. The regional dependence on farm income, which includes farm program payments, is highest in the NCNE region and lowest in the western region (Hamda, 2004).

Overall, South Dakota's dependency on federal payments showed a slight increase throughout the 1990's, while the level of dependency on farm program payments increased substantially statewide and in most sub-state regions.

### **Results and Discussion: Distribution of Farm Program Payments**

The USDA subsidies for farms in South Dakota totaled \$3.231 billion dollars from 1996 through 2001. These farm program payments (FPP) are divided into three major programs: commodity programs, conservation programs and disaster payments. During this six year period when the 1996 farm bill provisions were in effect, commodity programs received a total of \$2.570 billion or 79.5%, conservation programs received \$415 million or 12.8%, and disaster payments received \$244 million or 7.6 % of total farm program payments. Most of the annual variation in FPP was due to changes in the amount of loan deficiency payments and marketing loan payments for program crops. Also, the amount of disaster payments changed from year to year as disaster relief was not needed every year. Conservation program payments did not change much per year, while production flexibility contract payments were higher in the earlier years declining from a range of \$172.3 – \$176.6 million per year from 1996 – 1998 to \$117.5 million in 2001 (Hamda, 2004).

From 1996 to 2001, South Dakota received a total of \$3.321 billion in farm program payments. The annual number of FPP recipients, which included farm operators and farmland owners, varied from 46.9 to 48.7 thousand. The NCNE region received 35% (\$1.146 billion) of South Dakota's FPP for 29% of the state's recipients, while the ECSE region received 34% (\$1.111 billion) of FPP for 42% of the state's farm program



recipients. The amount of payments and number (proportion) of recipients were much lower in the other two regions. The SCC region received a total of \$618 million or 19% of the state's total FPP for 17% of the state's recipients. The western region received \$372 million or nearly 11.6% of the state's total farm program payments for 11.7% of the state's FPP recipients (table 4).

South Dakota's average annual farm program payment from 1996 – 2001 was \$11,295 per recipient, while the median annual FPP was only \$3,972. The NCNE region, had the highest average annual payment of \$13,967 per recipient, while recipients in the ECSE region received the lowest average annual payments of \$9,045. Since the number of recipients is similar each year, the average payment per recipient varied greatly across years. Statewide, average FPP per recipient were lowest in 1996 and 1997 (\$4,777 and \$5,517 respectively) and were highest in 2000 and 2001 with average annual payments of \$16,845 and \$15,293 respectively (Hamda, 2004).

The statewide annual average FPP from 1996 – 2001 varied from \$40,169 for the first quintile, \$10,450 for the second quintile, \$4,100 for the third quintile, and \$1,622 (\$424) for the fourth (fifth) quintile of FPP recipients. Similar magnitudes of payment inequality were noted in all sub-state regions and in selected counties, although the specific FPP amounts received varied by location. The highest amount of farm program payments in each quintile occurred in the NCNE region, while the lowest amount to FPP recipients in each quintile occurred in the ECSE region. The average amount of FPP per quintile of recipients was highest in 2000 or 1999, depending on region, and lowest in 1996. In each region, the annual average amount of FPP for all recipients was slightly



above (+4% to +11%) the annual average amount received by FPP recipients in the second quintile.

Depending on region, the highest quintile of recipients received from 68% to 71% of total FPP, the second quintile received 18% to 20% of total FPP, the third quintile received 7% to 8% of total FPP, while the last quintile received less than one percent of total FPP. The proportion of FPP received by the first quintile of recipients was lower in the ECSE and NCNE regions and higher in the western and SCC regions (table 4).

The state's average gini coefficient for FPP from 1996 to 2001 was 0.618. The gini-coefficient was less than the state's average in the more cropland intensive ECSE (0.608) and NCNE (0.602) regions, indicating a more balanced payment distribution. The gini coefficient of FPPs in the SCC region of 0.624 and western region of 0.621 was slightly higher than the state average, indicating a more uneven payment distribution (table 4).

During the study period, the statewide gini-coefficient for FPP concentration varied from 0.596 in 1997 to 0.634 in 2000. Across all regions, the lowest gini-coefficient for FPP concentration was 0.578 in the NCNE region in 1996 while the highest gini-coefficient was 0.645 in the western region in 1998 (Hamda, 2004).

#### **Statistical Analyses of Farm Program Payment Level and Distribution**

Regression analyses was used to estimate coefficients of single equation models to explain the distribution and concentration level (gini-coefficient) and average amount of farm program payments. Annual data from the sample of eight counties, two counties

per region and two counties per socio-economic category (frontier, rural, small trade center, and larger trade center) were used.

The following models were used in the analysis of gini-coefficient levels:

$$(A) \text{ Gini} = \alpha + \beta_1 \text{region} + \beta_2 \text{socioeconomic class} + \beta_3 \text{years} + \varepsilon_{1a}$$

$$(B) \text{ Gini} = \alpha + \beta_1 \text{payment} + \beta_2 \text{region} + \beta_3 \text{socioeconomic class} + \beta_4 \text{years} + \varepsilon_{1b}$$

The  $\varepsilon_1$  term is the error term associated with each model. Years is a classification variable in all models with the year 2001 included in the intercept. Region and socioeconomic class of counties are classification variables in models A and B. The western region and small trade center are included in the intercept. Average payment level is a continuous variable in model B. Results of model specifications including parameter estimates of coefficients and their t-statistics are presented in table 5. The “goodness of fit” or  $R^2$  for model A is 0.75, compared to an  $R^2$  of 0.83 for model B.

For model A, the overall coefficients for region, socioeconomic class, and year are statistically different from zero at  $p=0.05$ . The coefficients for each region, each socioeconomic class, and for the years 1996 and 1997 are statistically significant at the 5% or 1% level.

In model B, average payment level is added as an explanatory variable. Regional effect is less prominent after payment level is included, but the relationship between gini coefficient level and socioeconomic classification of counties grows stronger after payment level is added. The gini-coefficient level is significantly lower in rural and frontier counties than in trade center counties, indicating reduced level of payment inequality..

The addition of payment level made the category variable of year insignificant in explaining gini-coefficient level. The years 1996 and 1997 were statistically significant at the 1% probability level in model A, but not in model B. As expected, the parameter estimates for average payment in model B has a positive coefficient of 0.00307, which means that a one thousand dollar increase in average payment will lead to a .00307 increase in the level of the gini-coefficient (table 5)

The following model was used in the analysis of average payment level:

$$(C) \text{ Average Payment} = \alpha + \beta_1 \text{region} + \beta_2 \text{socioeconomic class} + \beta_3 \text{year} + \varepsilon_{1c}$$

where the explanatory classification variables of year, region, and socioeconomic class of counties are defined the same as in models A and B. However, in model C the level of average farm program payment is the dependent variable. Most of the coefficients for the explanatory variables are statistically different from zero at the 5% level of significance and model C has a high  $R^2$  of 0.87 and overall F-value of 22.7 (table 5).

Results, based on coefficient signs and their level of significance, indicate that average payment levels are substantially lower in the ECSE and NCNE regions than in the western or SCC regions. Average payment levels are substantially higher in rural counties and in frontier counties compared to trade center counties. Finally, average annual payments increased over time from 1996 to 2000.

### **Summary and Implications**

South Dakota's dependency on federal payments showed a slight increase during the 1990 – 2001 period. Federal payments, which include all federal transfer payments to individuals and farm program payments, were an average of 16.9% of personal income in

South Dakota from 1990 – 2001. Dependency on federal payments increased in the more rural counties and regions of the state.

Dependency of the state's farm sector on farm program payments increased substantially during the study period. Statewide, FPP averaged 36% of farm income in the 1990 – 1995 period and nearly 54% in the 1996 – 2001 period. The main reason for this result was the change in farm program provisions in 1996 and extensive use of loan deficiency payments and marketing loan payments during the latter period especially in 1999, 2000, and 2001.

The state's average annual farm program payment from 1996 – 2001 was \$11,295. Generally, the first quintile (top 20 percent) of recipients received about 70% of total payments, while the last quintile received less than 1% of total payments. Statewide, the annual average FPP was \$40,169 for the first quintile of recipients and only \$424 per recipient among the last quintile.

South Dakota's gini-coefficient for farm program payment distribution was 0.618 with slightly higher coefficients in the western and SCC region and lower coefficients of inequality in the NCNE and ECSE regions. In addition, the distribution of farm program payments showed increased inequality as average annual payment amounts increased.

Overall, the distribution of farm program payments was highly unequal in South Dakota regardless of region and specific year examined. It is interesting to note that the gini-coefficient for FPP inequality in various regions of South Dakota were similar to the gini-coefficient for income inequality (0.618) and earnings inequality (0.606) among self-employed persons in the U.S. as reported by Diaz-Gimenez (1997).



The amount of and distribution of farm program payments in South Dakota are primarily results of the following factors:

- (1) Most South Dakota farmers participate in federal farm programs for program crops (wheat, feed grains, soybeans, and other small grains and oilseed crops) and/or conservation programs, including cropland enrolled in the Conservation Reserve Program;
- (2) More than 40% of South Dakota cropland is leased and many landowners, in addition to farm operators, share in and receive farm program payments. In addition there are multiple operators on many farms. For these reasons, the number of FPP recipients exceeds the number of farm operations in all regions of South Dakota;
- (3) Farm program benefits received were closely related to the amount of base acres enrolled in commodity programs, historical program crop yields and /or current production and yields (depending on specific farm program provisions), payment rates authorized in CRP contracts or production flexibility contracts, and the use of loan deficiency payments or marketing loan payments for current production;
- (4) Distribution of farmland ownership and size of farm operations in any region of South Dakota is also highly unequal; and
- (5) Payment limits for specific farm programs did not impose effective limitations on size of South Dakota farms participating in federal farm programs.

Thus, the distribution of farm program payments in South Dakota largely reflects the growing inequality of farm size and farmland ownership patterns in the state.

Since farm operators and farm households are increasingly integrated with their state and national economy it is likely that the income (and perhaps wealth) distribution of farmers is similar to that of other household with self-employed persons.

U.S. farm commodity programs are not designed, in practice, to greatly alter the income or wealth distribution of farmers and farmland owners, in the short and intermediate run. Over a longer period, farm programs have likely altered risks faced by individuals and favored growth-oriented farm businesses and farmland owners. Thus, we should not expect existing types of farm programs to reduce income inequality in the farm sector.

Major conclusions of this study are that dependency of South Dakota's farm sector on farm program payments is relatively high and increased during the 1996 – 2001 period. In addition, the FPP distribution showed increasing inequality as the average annual payment amounts increased. Comparisons of South Dakota study findings with other empirical studies of U.S. household earnings and income distributions suggest that the inequality of FPP distribution may be closely related to national income distribution trends within and outside of the farm sector.

A more complete understanding of the impacts of farm program payment would require data on household income, earnings, and wealth along with farm program payment and federal transfer payment information for farm households and other households receiving farm program payments.

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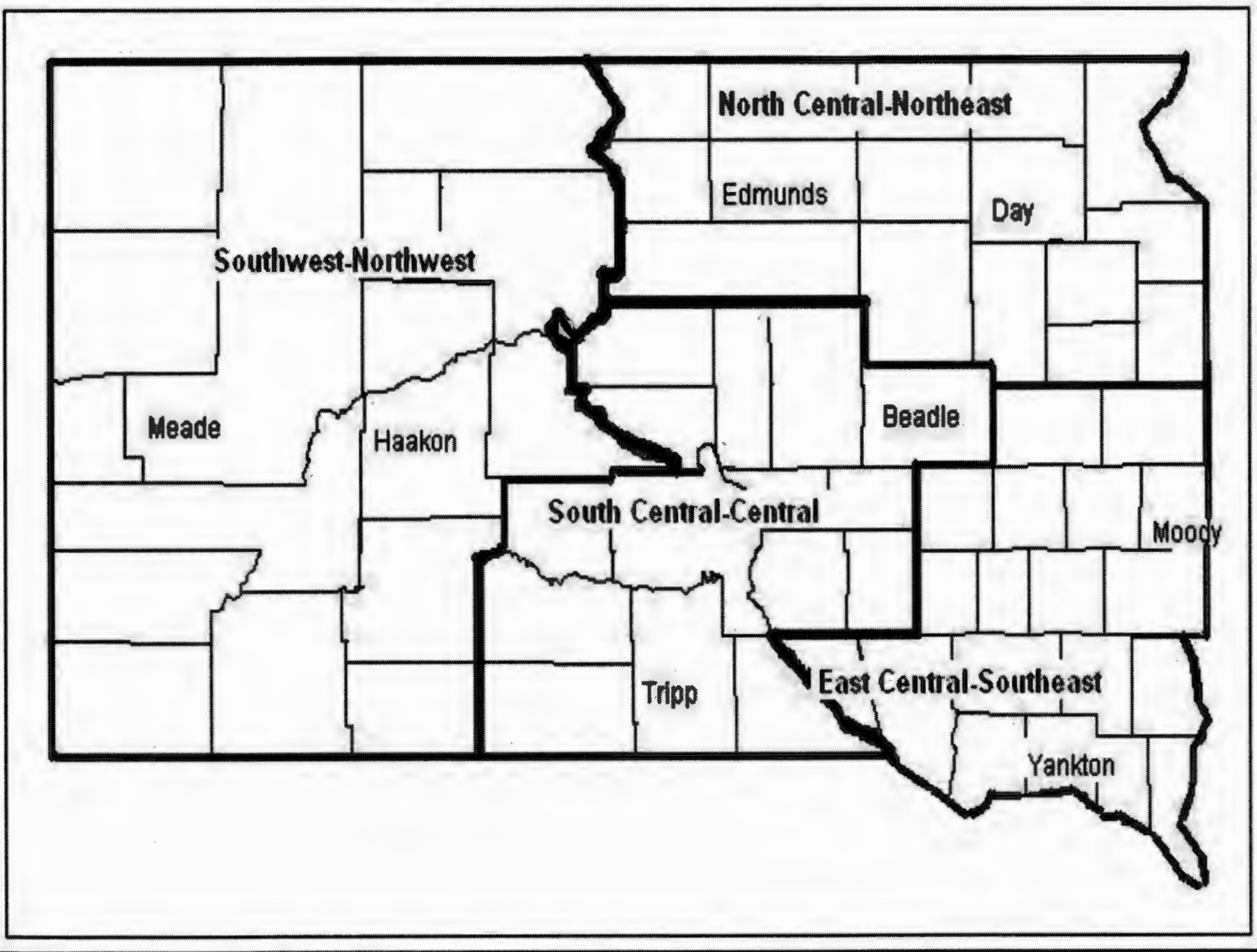


Figure 1. South Dakota agricultural regions and selected counties.



Table 1. Selected characteristics of South Dakota and its agricultural regions.

	<u>State</u>	<u>ECSE<sup>a</sup></u>	<u>NCNE<sup>a</sup></u>	<u>SCC</u>	<u>Western</u>
Population (2000) thousand	755.8	302.0	131.8	122.7	200.0
Percent of state population	100.0	40.0	17.4	16.2	26.4
Number of farms (1997)	29,877	10,051	8,403	5,420	6,003
Percent of state total	100.0	33.6	28.1	18.1	20.1
Average farm size (acres)	1,418	643	1,013	1,710	3,353
Land in farms (1,000 acres)	44,355	6,460	8,516	9,260	20,118
Percent of state total	100.0	14.6	19.2	20.9	45.3
Cropland as percent of total land in farms	43.7	82.0	70.8	46.0	18.1

Source: South Dakota Agriculture, 2002; Census of Population, 2000.

Agriculture Regions:

ECSE = East Central & Southeast      SCC = South Central & Central  
 NCNE = North Central & Northeast      Western = Northwest, Southwest, West Central

Table 4.4.1

## SOUTH DAKOTA'S DEPENDENCY, 1990-2001

	1990	1991	1992	1993	1994	1995	90-95	1996	1997	1998	1999	2000	2001	96-01	Ave Annual change(90-01)
<i>Population</i>	697,101	703,669	712,801	722,159	730,790	737,925		742,213	744,223	746,058	750,412	755,783	758,324		
<i>(\$million)</i>															
<b>Personal income</b>	11,312	11,896	12,732	13,297	14,176	14,454	<b>77,867</b>	15,882	16,287	17,497	18,441	19,510	20,145	<b>107,762</b>	<b>5.4%</b>
<i>Nonfarm PI</i>	10,353	11,052	11,792	12,452	13,193	13,930	<b>72,772</b>	14,675	15,457	16,473	17,363	18,475	19,304	<b>101,747</b>	<b>5.8%</b>
<i>Farm income</i>	958	844	939	844	983	523	<b>5,091</b>	1,207	830	1,023	1,078	1,035	840	<b>6,013</b>	<b>-1.2%</b>
<b>Federal Payments</b>	1,863	1,944	2,077	2,355	2,305	2,414	<b>12,958</b>	2,521	2,638	2,851	3,270	3,411	3,535	<b>18,226</b>	<b>6.0%</b>
<i>Fed tran Pymts</i>	1,531	1,658	1,806	1,923	2,016	2,170	<b>11,104</b>	2,292	2,370	2,414	2,479	2,622	2,820	<b>14,997</b>	<b>5.7%</b>
<i>Farm Prog Pymts</i>	332	286	271	432	289	244	<b>1,854</b>	229	268	437	791	789	715	<b>3,229</b>	<b>7.2%</b>

	1990	1991	1992	1993	1994	1995	90-95	1996	1997	1998	1999	2000	2001	96-01	Average Value (90-01)
<b>1 Federal Payments as % of PI</b>	16.5%	16.3%	16.3%	17.7%	16.3%	16.7%	<b>16.6%</b>	15.9%	16.2%	16.3%	17.7%	17.5%	17.5%	<b>16.9%</b>	<b>16.7%</b>
<b>2 Farm Program Pymts as % of PI</b>	2.9%	2.4%	2.1%	3.2%	2.0%	1.7%	<b>2.4%</b>	1.4%	1.6%	2.5%	4.3%	4.0%	3.5%	<b>3.0%</b>	<b>2.7%</b>
<b>3 Farm Program Pymts as % of FI</b>	34.7%	33.9%	28.9%	51.2%	29.4%	46.7%	<b>36.4%</b>	19.0%	32.3%	42.7%	73.4%	76.2%	85.1%	<b>53.7%</b>	<b>46.0%</b>

Source: BEA, 1990-2001

Table 2. South Dakota's federal payment and farm payment dependency, 1990-2001.

Table3. Farm program payment and federal payment dependency in South Dakota, statewide and regional, 1990-1995, 1996-2001 and 1990-2001.

<b>State:</b>	<b>South Dakota</b>		
<b>Years:</b>	<b>1990-1995</b>	<b>1996-2001</b>	<b>1990-2001</b>
Federal Payments as % of Personal Income	16.6%	16.9%	16.7%
Farm Program Payment as % of Personal Income	2.4%	3.0%	2.7%
Farm Program Payment as % of Farm Income	36.4%	53.7%	46.0%
<b>Region:</b>	<b>East Central &amp; Southeast (ECSE)</b>		
<b>Years:</b>	<b>1990-1995</b>	<b>1996-2001</b>	<b>1990-2001</b>
Federal Payments as % of Personal Income	14.0%	13.5%	13.7%
Farm Program Payment as % of Personal Income	1.4%	2.0%	1.7%
Farm Program Payment as % of Farm Income	26.4%	40.6%	36.7%
<b>Region:</b>	<b>North Central &amp; Northeast (NCNE)</b>		
<b>Years:</b>	<b>1990-1995</b>	<b>1996-2001</b>	<b>1990-2001</b>
Federal Payments as % of Personal Income	20.6%	22.0%	21.2%
Farm Program Payment as % of Personal Income	4.2%	6%	5.1%
Farm Program Payment as % of Farm Income	33.7%	53.8%	43.6%
<b>Region:</b>	<b>South Central &amp; Central (SCC)</b>		
<b>Years:</b>	<b>1990-1995</b>	<b>1996-2001</b>	<b>1990-2001</b>
Federal Payments as % of Personal Income	19.5%	20.3%	19.8%
Farm Program Payment as % of Personal Income	4.1%	4.8%	4.3%
Farm Program Payment as % of Farm Income	35.8%	59.5%	50.0%
<b>Region:</b>	<b>Western</b>		
<b>Years:</b>	<b>1990-1995</b>	<b>1996-2001</b>	<b>1990-2001</b>
Federal Payments as % of Personal Income	16.5%	17.4%	16.9%
Farm Program Payment as % of Personal Income	1.8%	1.4%	1.6%
Farm Program Payment as % of Farm Income	108.9%	157.4%	129.0%



Table 4. Distribution of farm program payments in South Dakota, statewide and regional,  
1996-2001

State/Region	South Dakota	ECSE	NCNE	SCC	Western
Year	1996-2001	1996-2001	1996-2001	1996-2001	1996-2001
Total farm program payments (thousands of dollars)	3,231,353	1,111,276	1,146,816	618,805	372,126
Annual average number of recipients	47,682	16,667	13,685	7,937	5,563
Annual ave. payment per recipient (\$)	11,295	9,045	13,967	12,995	11,149
<b>Distribution of Payments by Quintiles</b>					
1 <sup>st</sup>	70.12%	68.83%	67.88%	70.93%	70.63%
2 <sup>nd</sup>	18.67%	19.37%	19.75%	18.25%	18.30%
3 <sup>rd</sup>	7.48%	7.64%	8.22%	7.35%	7.52%
4 <sup>th</sup>	2.93%	3.20%	3.29%	2.75%	2.89%
5 <sup>th</sup>	0.80%	0.96%	0.87%	0.73%	0.67%
<b>Sum of Payments, 1996 - 2001 In Each Quintile (\$1000)</b>					
1 <sup>st</sup>	2,286,160	774,811	794,138	443,542	263,209
2 <sup>nd</sup>	595,064	211,278	220,169	111,087	67,797
3 <sup>rd</sup>	233,600	81,661	88,199	43,619	27,873
4 <sup>th</sup>	92,372	34,038	35,238	16,373	10,783
5 <sup>th</sup>	4,143	9,482	9,071	4,182	2,465
<b>Annual Average Payment In Each Quintile (\$ / recipient)</b>					
1 <sup>st</sup>	40,169	31,647	48,586	46,729	39,860
2 <sup>nd</sup>	10,450	8,621	13,462	11,702	10,251
3 <sup>rd</sup>	4,101	3,332	5,389	4,592	4,213
4 <sup>th</sup>	1,622	1,389	1,703	1,724	1,635
5 <sup>th</sup>	424	387	554	440	375
<b>Gini Coefficient of Payment Distribution</b>	<b>0.618</b>	<b>0.608</b>	<b>0.6021</b>	<b>0.624</b>	<b>0.621</b>

Source: Data made available by USDA-FSA and compiled by Yonas Hamda

Agricultural Regions:

ECSE = East Central & Southeast

NCNE = North Central & Northeast

SCC = South Central & Central

Western - Northwest, West Central & Southwest



Table 5. Summary of general linear model analysis for gini-coefficient of farm program payment distribution (model A and B) and average payment level (model C)

Model:	A	B	C
Variable	Parameter Estimate	Parameter Estimate	Parameter Estimate
INTERCEPT	0.64 (89.60***)	0.613 (62.96***)	10.51 (7.75***)
PAYMENT (\$000)		0.00307 (4.19***)	
REGION:			
ECSE	-0.020 (-2.48***)	-0.00148 (-0.14)	-6.35 (-4.06***)
NCNE	-0.015 (-2.07***)	-0.00142 (0.21)	-4.39 (-3.24***)
SCC	-0.019 (-2.67***)	-0.02589 (-4.20***)	2.16 (1.60)
SOCIO-ECON CLASS:			
FRONTIER	-0.013 (-1.91**)	-0.05282 (-4.78***)	12.71 (9.38***)
LARGE TRADE CENTER	-0.0135 (-1.89**)	-0.03091 (-4.26***)	5.64 (4.16***)
RURAL	-0.020 (-2.50**)	-0.05205 (-5.13***)	10.16 (6.49***)
YEAR:			
1996	-0.037 (-5.19***)	-0.00988 (-1.12)	-8.94 (-6.60***)
1997	-0.040 (-5.61***)	-0.01294 (-1.46)	-8.92 (-6.59***)
1998	-0.011 (-1.63)	0.00725 (0.79)	-5.68 (-4.20***)
1999	-0.005 (-0.80)	-0.00972 (-1.61)	1.29 (0.95)
2000	0.003 (0.45)	-0.00003 (-0.01)	1.06 (0.79)
Overall Model Statistics:			
R-Squared	0.75	0.83	0.87
F-Value	9.79	14.57	22.72
Number of Observations	48	48	48

\*\*\*Significant at the 1% level, \*\*Significant at the 5% level.

The t-statistic for the coefficient is listed in parentheses